
Space Weather Forecast

Issued on Saturday, 20 April 2024 at 01:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Further Moderate flares likely and a slight chance of Strong flares. Slight chance of G1/Minor Storms, mainly Days 2-4 due to possible glancing blows from Coronal Mass Ejections (CMEs).

Solar Activity: Activity is currently Moderate. The largest flare was a Moderate flare at 19/0453 UTC from a small region amongst a cluster of sunspot groups in the southeast disc. There are fifteen sunspot regions currently visible on the disc, of which the largest is in the northeast quadrant. The most magnetically complex region lies within the cluster of sunspots located in the south-centre of the disc, of which two other groups show moderate to complex magnetic structures. Individually the regions within this feature are relatively modest in size. The remaining regions on the visible disc appear generally stable with only slight or no changes through the period. A new region has recently emerged just ahead of the complex in the south-centre of the disc.

Several coronal mass ejections (CMEs) have been observed on imagery and are thought to be attributed to one of the complex sunspot groups in the southeast disc near the centre which has produced a number of eruptions during 19 Apr. Analysis of these CMEs is currently underway and awaiting Enlil modelling. Low confidence in the potential for any Earth-directed component.

Solar Wind / Geomagnetic Activity: Solar wind parameters started the period at background levels, before increasing to slightly elevated levels, just above 400km/s, due to the late arrival of a CME which left the Sun on the 15 Apr. Since 19/1350UTC winds have gradually increased further and are now close to Elevated levels 490-500km/s, this is thought to be the result of an early connection to a stream of fast winds from a coronal hole. The magnetic field (IMF) strength, Bt, was initially weak, before increasing around 19/0500 UTC to Moderate to Strong. IMF values decreased from around 19/1900UTC and have been weak since 19/2243UTC. The important north-south component, Bz, fluctuated weakly initially, becoming negative due to the CME arrival. Bz, has weakly fluctuated since 19/1830 UTC and is now weakly positive. Resultant geomagnetic activity was mostly Quiet (Kp0-2) initially, before increasing to reach G1/Minor Storm (Kp5) interval from 19/0600-0900 UTC and peaking at G2/Moderate Storm (Kp 6) 19/1500-1800 and 19/1800-2100UTC. Some observatories reported crossing the threshold to Kp 7 during those intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast with isolated Moderate-class flares expected and a slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: Solar winds are currently at slightly elevated levels due to the combination of a recent coronal mass ejection (CME) arrival and the onset of a recurrent stream of fast winds from a coronal hole. This feature is expected to become increasingly geoeffective through Day 1 (20 Apr) with wind speeds likely increasing to elevated levels before

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waning Day 3 (22 Apr). Slight chance of further enhancement should glancing blows from CMEs occur during the period.

Geomagnetic activity is expected to decline to be mostly Quiet (Kp 1-2) or Unsettled (Kp 3) through the period. There is a slight chance that activity may increase again to Active or G1/Minor Storm (Kp 4-5) levels Day 1 but this is considered low confidence. Weak glancing blows from CMEs are possible late Day 2 (21 Apr) or Day 3 (22 Apr), with low confidence for further glancing blows Days 3-4, with associated ongoing slight chance of Active or G1/Minor Storm (Kp 4-5) intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background with no Solar Radiation storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	Yes	20	20	20	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	No	20	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	10	10	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)